Vigilohm IM10, Vigilohm IM20

Insulation Monitoring Device
User Manual

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VIGED310022EN

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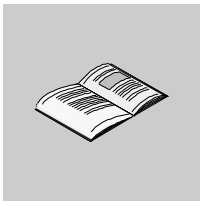

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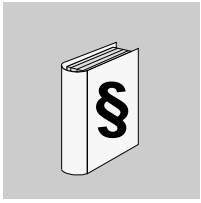
Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

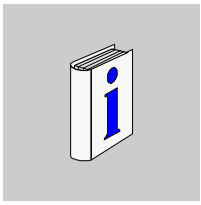
NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This manual is intended for use by designers, system builders, and maintenance technicians who are concerned with ungrounded electrical distribution systems (IT) featuring insulation monitoring devices (IMDs).

Validity Note

The Vigilohm IM10 and IM20 are used to check the insulation of ungrounded distribution systems in industrial and naval contexts as well as in infrastructures. They are suitable for small and medium-sized systems (C < 40 µF) without an automatic fault locator.

Related Documents

Title of Documentation	Reference Number
Instruction Sheet: Vigilohm IM10 Insulation Monitoring Device	BBV35440
Instruction Sheet: Vigilohm IM20 Insulation Monitoring Device	BBV35475
The IT earthing system: a solution to improve industrial electrical network availability - Application guide	PLSED110006EN
Système de liaison à la terre IT - Une solution pour améliorer la disponibilité des réseaux électriques dans l'industrie - Guide d'application	PLSED110006FR
System earthings in LV Les schémas des liaisons à la terre en BT (régimes du neutre)	Cahier technique n° 172
The IT system earthing (unearthed neutral) in LV Le schéma IT (à neutre isolé) des liaisons à la terre en BT	Cahier technique n° 178

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User Comments

We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.

Presentation

1

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	10
Physical Description	12
Accessories	13

Presentation

Use the IT System to Improve the Availability of Power Systems

Continuity of service is an essential operational requirement for power systems, as is ensuring the protection of people and property. There are many applications which vary from country to country. Apart from mandatory situations (hospitals, the navy), the IT grounding system is typically used in instances where the unavailability of power would result in lost production or incur significant downtime costs. Other potential applications are when there is a need to minimize the risk of fire and explosion. Lastly, the IT grounding system is chosen in certain cases because it can help facilitate preventive and corrective maintenance operations.

The "ungrounded" IT system is the best option for ensuring continuity of service. Even after an initial insulation fault has occurred, the installation can continue to function without posing any danger to people or equipment. However, the faulty circuit must be detected and repaired before a second fault occurs. The fact that the IT system can tolerate an initial fault means that maintenance operations can be improved and carried out safely and without any pressure.

Monitor Insulation Resistance (R)

Standards IEC 364 and IEC 61557-8 clearly state that, with the IT system, the installation must either be ungrounded or must be grounded using a sufficiently high level of impedance.

In the event of only one ground or earth fault, the fault current is very low and interruption is unnecessary . However, given that a second fault could potentially cause the circuit breaker to trip, an insulation monitoring device has to be installed to indicate an initial fault. This device must trigger an audible and/or a visual signal.

By constantly monitoring the insulation resistance, you can keep track of the system quality, which is a form of preventive maintenance.

Monitor the Leakage Rate (C)

According to standard IEC 60364-4-41, the following applies to an AC system:

$$R_A \times I_d \leq 50\ V$$

Where:

- R_A is the sum of the resistance values in Ω for the ground connection.
- I_d is the fault current, in A, in the event of an initial dead short.

Thus, it is necessary to have a good level of grounding resistance and to monitor C, as I_d is dependent on the impedance of C ($I_d = U / Z_c$).

One solution is to display the value of C so you can check that it is below the limit. It is also important to avoid a situation whereby an industrial site is dependent on a single isolation transformer, particularly as a result of grounding schemes being shared by different applications (plant shutdown). Example limits: 70 µF for a 440 V system, 40 µF for a 690 V system.

For more information, see *Cahier Technique n°178*.

Function of Vigilohm IM10 and IM20 Devices

The Vigilohm IM10 and IM20 are digital insulation monitoring devices (IMDs) for low-voltage systems with isolated neutral IT (Umax = 480 Vac Ph-Ph or Umax = 345 Vdc). They can be used to monitor the insulation of a system and signal any insulation faults as soon as they occur.

The Vigilohm IM10 and IM20 apply a low-frequency AC voltage between the system and ground. The insulation is then assessed on the basis of the current value returned. This method is used for all types of system: AC, DC, mixed, with rectifiers, with variable speed drives, etc.

The Vigilohm IM10 and IM20 offer the following functions:
- Insulation resistance display (R)
- Detection of insulation faults in accordance with a configurable threshold

The Vigilohm IM20 offers the following additional functions:
- Leakage rate display (C) with display of associated impedance (Zc)
- Communication via the Modbus RS-485 protocol
- Injection inhibition via logic input
- Insulation fault log

Selection Guide

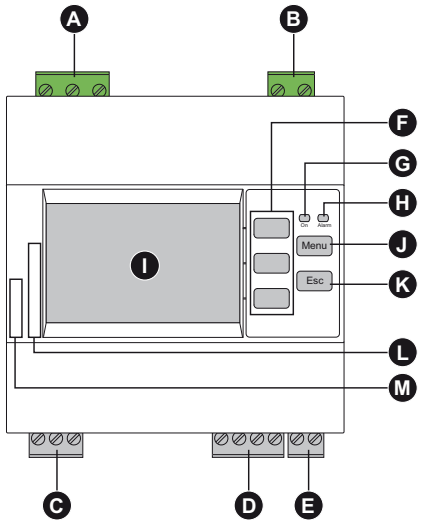
Function	Vigilohm IM10	Vigilohm IM20
Measurement and display of IT system insulation resistance	√	√
Measurement and display of leakage rate (C)	–	√
Calculation of impedance Zc associated with C	–	√
Time-tagged insulation fault log	–	√
Communication via Modbus RS-485	–	√
Injection inhibition input	–	√
Compatibility with high-voltage plate	–	√

Physical Description

Physical Description

Physical Description

The Vigilohm IM10 and IM20 feature 3 and 5 terminal blocks respectively (identifiers A to E). The various features of the Vigilohm are shown in the diagram below:



A Injection terminal block
B Vigilohm auxiliary power supply terminal block
C Alarm relay terminal block
D Modbus communication terminal block (Vigilohm IM20)
E Injection inhibition input terminal block (Vigilohm IM20)
F Contextual menu buttons
G Operating LED
H Alarm LED
I Display
J **Menu** button for accessing main menu
K Button for returning to previous menu or canceling a parameter entry
L Vigilohm serial number
M Vigilohm product catalog number (IMD-IM10 or IMD-IM20)

Accessories

Presentation

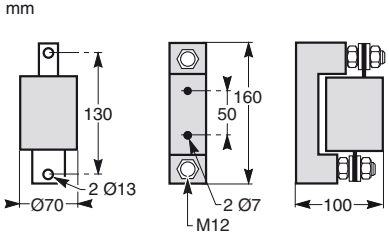
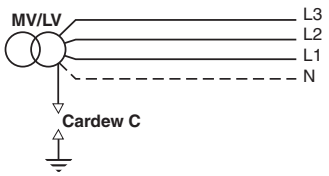
The following accessories are sometimes required when installing the Vigilohm IM10 and IM20:
- A surge limiter Cardew C
- A ZX plate

Below is a list of accessories for the Vigilohm devices:

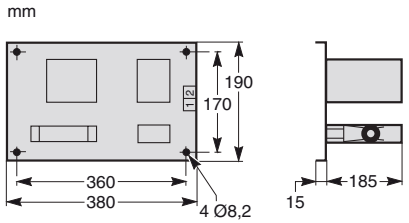
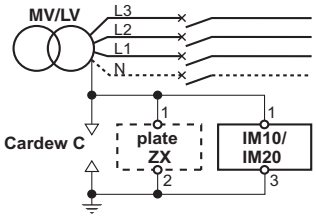
Accessory	Vigilohm IM10	Vigilohm IM20	Catalog number
Cardew C “250 V” surge limiter	√	√	50170
Cardew C “440 V” surge limiter	√	√	50171
Cardew C “660 V” surge limiter	–	√(1)	50172
Cardew C “1000 V” surge limiter	–	√(1)	50183
Cardew C base	√(2)	√(2)	50169
ZX plate (limiting impedance)	√	√	50159
High-voltage (HV) plate HV-IM20	–	√	IMD-HV-IM20-1.7
(1) Compatible with the Vigilohm IM20 when used with HV plate HV-IM20 **(2)** Compatible with all Cardew C catalog numbers			

NOTE: For all information regarding mobile fault locating accessories, please refer to the relevant section *(see page 56)*.

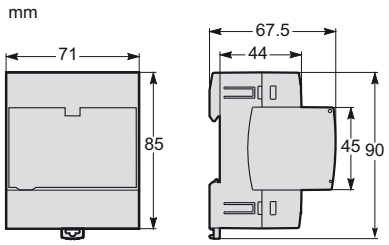
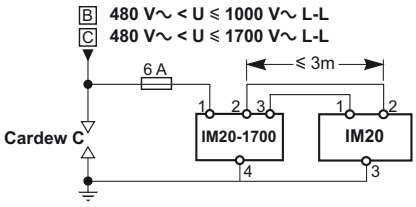
Cardew C Surge Limiter

Function	The Cardew C is used if the insulation monitoring device is connected to the secondary of an MV/LV transformer (according to the rules and conventions that apply in the various countries). It protects the low-voltage (LV) installation against overvoltage hazards. It is connected to the transformer secondary. The Cardew C can be used on the following systems: ● U < 1000 Vac ● U < 300 Vdc			
Selection Table	**Un: Nominal Phase-to-Phase Voltage of AC System**		**Ui: Flashover Voltage**	**Type of Cardew C**
	Neutral available	Neutral not available		
	U ≤ 380 V	U ≤ 220 V	400 V < Ui ≤ 750 V	“250 V”
	380 V < U ≤ 660 V	220 V < U ≤ 380 V	700 V < Ui ≤ 1100 V	“440 V”
	660 V < U ≤ 1000 V	380 V < U ≤ 660 V	1100 V < Ui ≤ 1600 V	“660 V”
	1000 V < U ≤ 1560 V	660 V < U ≤ 1000 V	1600 V < Ui ≤ 2400 V	“1000 V”
Dimensions	mm 			
Mounting	● Cardew C mounted directly on busbars ● Mounting with plate-mounted base			
Connection				

ZX Limiting Impedance

Function	ZX limiting impedance enables you to create an installation with a high-impedance grounded neutral system (1500 Ω to 50 Hz). ZX limiting impedance can be used on the following systems: ● Umax = 480 Vac ● Umax = 345 Vdc
Dimensions	
Mounting	On mounting plate
Connection	

High-voltage (HV) Plate for Vigilohm IM20

Function	The high voltage plate (catalog number IMD-IM20-1700) can be used to connect a Vigilohm IM20 to voltage systems higher than 480 Va L-L (connection with 400 V cable).
Dimensions	
Mounting	On DIN rail
Connection	

Installation

2

What's in this Chapter?

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DIN Rail Mounting and Dismantling	20
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Safety Measures

Specific Hazard Associated with Insulation Monitoring Devices (IMDs)

In the case of almost all electric and electronic devices, the device's power supply is the root cause of electrical hazards. The hazard can be eliminated by disconnecting the power supply.

This is not the case with insulation monitoring devices, which are connected to the system via the injection wire.

Consequently, this connection must be broken before carrying out any kind of work on the product.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before carrying out work of any kind, disconnect the Vigilohm from the monitored system by disconnecting the injection wire at terminal 1. Disconnect all the power supplies running to the Vigilohm and the equipment on which it is installed.
- Always use a correctly calibrated voltage tester to check that the injection wire and power supply have been properly disconnected.

Failure to follow these instructions will result in death or serious injury.

Other Safety Measures

Carefully read through the safety measures described below. You are always required to implement them fully before attempting to install, repair, or service electrical equipment.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

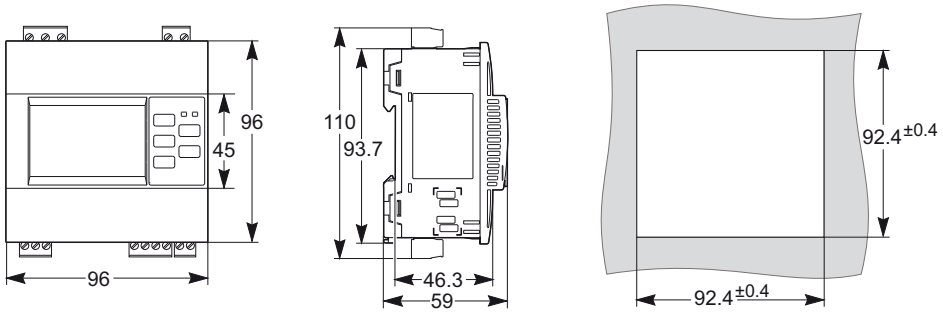
- Wear suitable personal protective equipment and follow the currently applicable electrical safety instructions.
- This equipment may only be installed by qualified electricians who have read all the relevant information.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested and tagged. Pay particular attention to the design of the power system. Consider all power supply sources, particularly the potential for backfeed.
- Before closing protective covers and doors, carefully inspect the work area to ensure that no tools or objects have been left inside the equipment.
- Take care when removing or replacing panels. Take special care to ensure that they do not come into contact with live busbars. To minimize the risk of injuries, do not tamper with the panels.
- The successful operation of this equipment depends upon proper handling, installation, and operation. Failure to follow basic installation procedures can lead to personal injury as well as damage to electrical equipment or other property.
- NEVER shunt an external fuse/circuit breaker.
- The Vigilohm must be installed in a suitable electrical cabinet.

Failure to follow these instructions will result in death or serious injury.

Dimensions

Vigilohm Dimensions

mm



⚠ CAUTION

CUTTING HAZARD

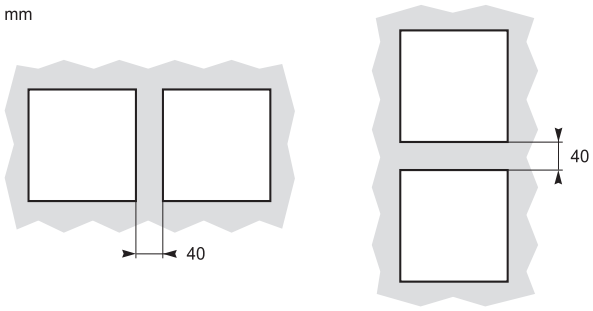
Trim the edges of the cut-out plates to remove any jagged edges.

Failure to follow these instructions can result in injury or equipment damage.

Constraints for Flush-mounting

Observe the correct distances between devices.

mm



Flush-mounting and Dismantling

Presentation

The Vigilohm can be attached to any flat, rigid vertical support using the 3 spring clips supplied. The device must not be tilted following installation.

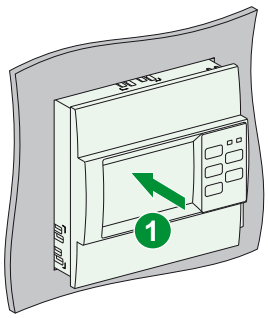
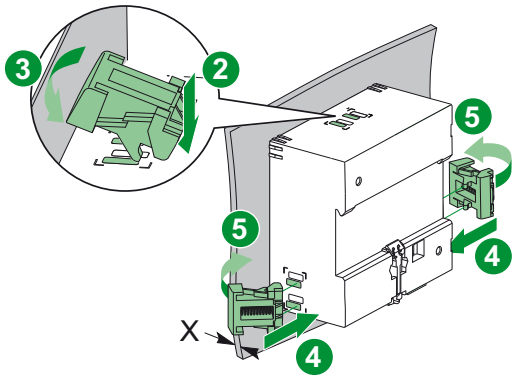
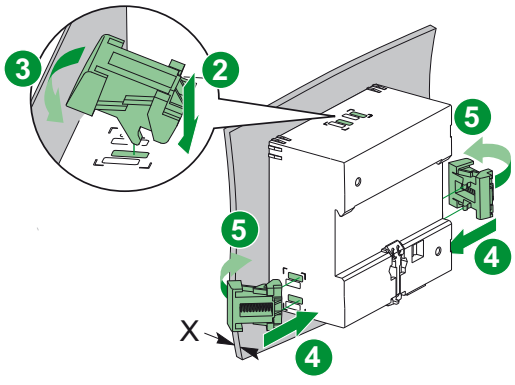
To free up useful space for control gear, you can attach the Vigilohm to the front panel of the floor-standing or wall-mounted enclosure.

Installation on a Support

Before attaching the Vigilohm, check the following:

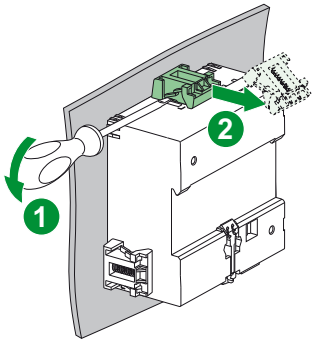
- The mounting plate must have a thickness of between 0.8 and 3.2 mm.
- A square measuring 92 x 92 mm must be cut out from the plate so the device can be installed.
- No terminal blocks may be connected to the unit.

To install the Vigilohm, proceed as follows:

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>1</td><td colspan="2">Insert the Vigilohm in the cut-out in the mounting plate by tilting the device forward slightly.
  </td></tr>
<tr><td rowspan="3">2</td><td colspan="2">Depending on the thickness of the mounting plate, clip the 3 spring clips into the fixing slots on the device as follows:</td></tr>
<tr><td>Mounting Plate Thickness</td><td>Fixing Slots to Be Used</td></tr>
<tr><td>0.8 mm ≤ X ≤ 2 mm</td><td>  </td></tr>
<tr><td></td><td>2 mm < X ≤ 3.2 mm</td><td>  </td></tr>
<tr><td>3</td><td colspan="2">Wire up and insert the terminal blocks as shown in the relevant wiring diagram (see page 21) and as appropriate for the type of device concerned (Vigilohm IM10 or IM20) (see page 12).</td></tr>
</table>

Removal from a Mounting Plate

To remove the Vigilohm from a mounting plate, proceed as follows:

Step	Action
1	Disconnect the terminal blocks from the Vigilohm.
2	Deal with each of the 3 spring clips as follows: Insert the blade of a screwdriver between the spring clip and the device. Then use the screwdriver as a lever to release the spring clip. 
3	Reinsert the terminal blocks, making sure that the correct positions on the device (Vigilohm IM10 or IM20) *(see page 12)* are observed.

DIN Rail Mounting and Dismantling

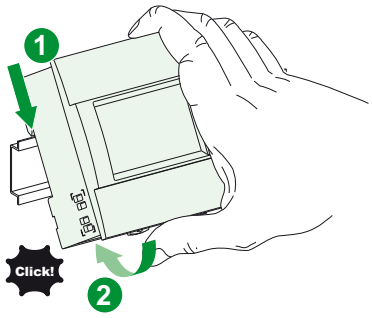
Presentation

You can install the Vigilohm on a DIN rail. The device must not be tilted following installation.

When mounting the device on, or dismantling it from, a DIN rail, you can keep the terminal blocks connected and/or wired up, or you can remove them and keep them to hand.

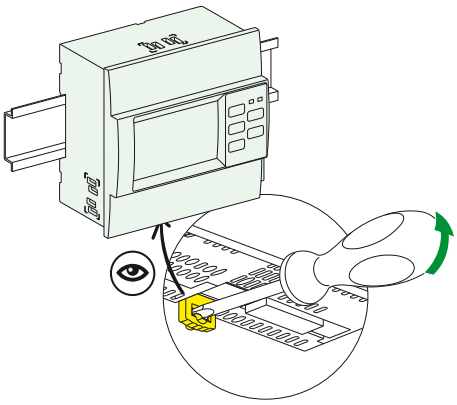
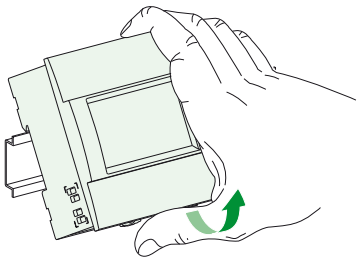
DIN Rail Mounting

To install the Vigilohm on a DIN rail, proceed as follows:

Step	Action
1	Position the 2 upper slots on the rear of the Vigilohm on the DIN rail.
2	Press the device against the DIN rail until the locking mechanism engages. The device is now attached to the rail. 

Removal from a DIN rail

To remove the Vigilohm from a DIN rail, proceed as follows:

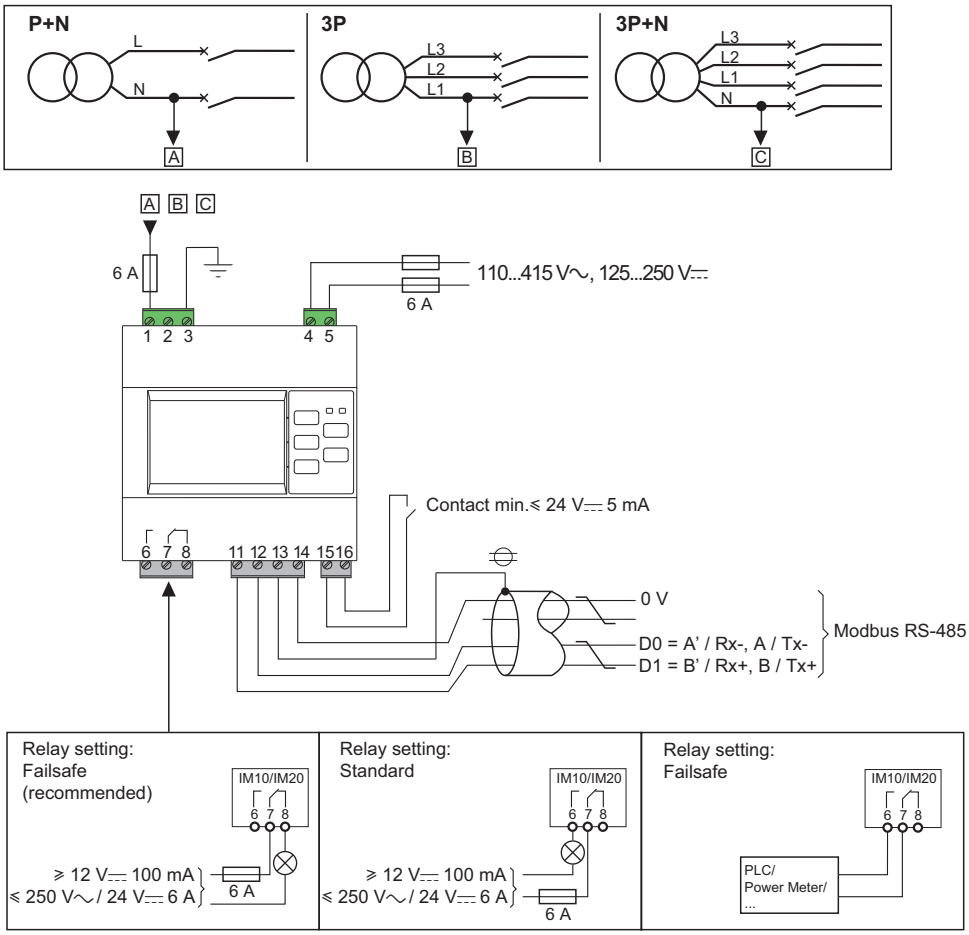
Step	Action
1	Using a flat screwdriver (≤ 6.5 mm), lower the locking mechanism to release the device. 
2	Lift the device up to free it from the DIN rail. 

Connection

Connection Diagram

The diagram below illustrates how to connect the Vigilohm to a single-phase or three-phase 3- or 4-wire power system.

NOTE: Terminals 11 to 16 are not available on the Vigilohm IM10.



The relay operating mode (fail-safe or standard) is controlled via the HMI of the Vigilohm device (IM10/IM20) or by means of Modbus communication (Vigilohm IM20).

Connection Characteristics

All the terminals of the Vigilohm IM10 and IM20 have identical characteristics.

The table below shows the characteristics of the cables that can be used to connect the terminals:

Stripped Length	Cable c.s.a.	Tightening Torque	Type of Screwdriver
7 mm	0.2...2.5 mm²	0.8 N•m	Flat, 3 mm

Typical Applications

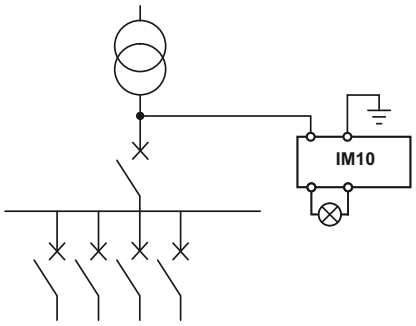
Presentation

The following section presents 3 insulation monitoring applications for an IT island:
- One with a Vigilohm IM10
- One with a Vigilohm IM10 where the alarm is sent to a supervisor
- One with a networked Vigilohm IM20

Monitoring the Insulation of an IT Island with a Vigilohm IM10

An IT island is a subsystem involving the use of a transformer whose neutral is not connected to ground.

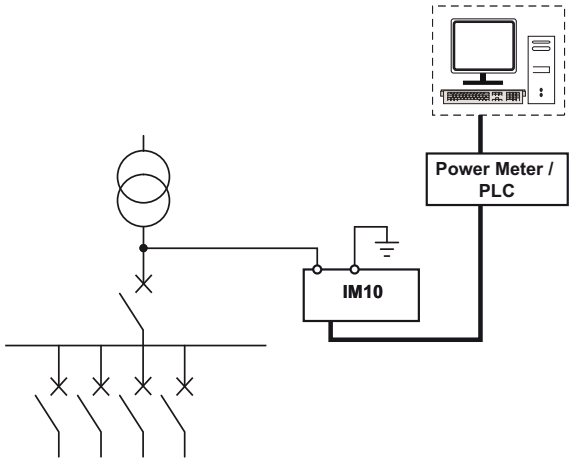
The insulation is monitored by a Vigilohm IM10 with the following characteristics:
- It is generally powered by the system that it monitors.
- It is connected to neutral (or to one phase) and ground.
- Its only setting is the fault threshold level.
- It has a single relay output to a light or alarm sound.



Monitoring the Insulation of an IT Island with a Vigilohm IM10 Where the Alarm is Sent to a Supervisor

The insulation is monitored by a Vigilohm IM10 whose alarm output is connected to an available input on a networked device (a Power Meter or a PLC, for example). This device is itself connected to a supervisor via a communication network.

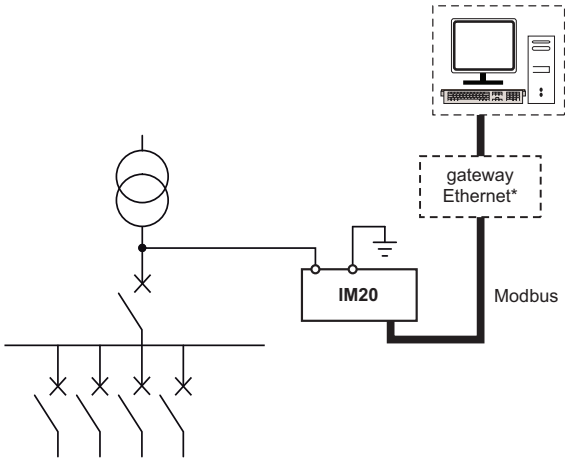
The restriction as far as this architecture is concerned is the fact that only the fault information is available at supervisor level.



Monitoring the Insulation of an IT Island with a Networked Vigilohm IM20

When the Vigilohm IM20 monitoring device is linked to the supervisor via a Modbus connection, the following actions are supported:

- Display:
  - The status of the product
  - The status of the alarm (active, not active, acknowledged)
  - Details of the last 30 time-tagged events
  - The values for R and C in order to create tables or curves for monitoring these values over variable periods
- Configure the product remotely. All the settings can be accessed remotely, with the exception of the Modbus parameters.



***** The architecture option that involves going via an Ethernet gateway enables you to make use of an existing Ethernet network.

Functions

3

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
R and C Measurement	26
Monitoring the System Insulation	28
Injection Inhibition Input (Vigilohm IM20)	31
Self-test	34

R and C Measurement

Insulation Measurements

The Vigilohm IM10 and IM20 are designed to monitor the IT system insulation and continuously measure R, which is the insulation resistance (kΩ).

The Vigilohm IM20 also measures C, which is the leakage rate to the distribution system (µF), and calculates the impedance Zc (kΩ) associated with C.

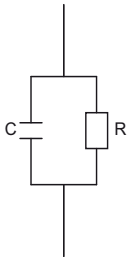
General Information Regarding the Measurement Accuracy of R

When measuring the insulation resistance R, a high degree of accuracy is not required because the aim is merely to detect a fault and to anticipate an abnormal drop in the insulation value.

In practice, the level of accuracy remains good (< 5 %) across the normal usage range. Although it deteriorates outside of this range, there is no impact as far as the user is concerned.

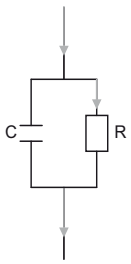
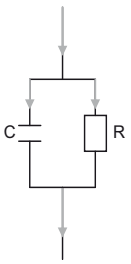
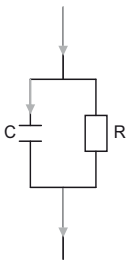
Physical Limits of R and C

The diagram below shows the insulation resistance R and the leakage rate C of the system.



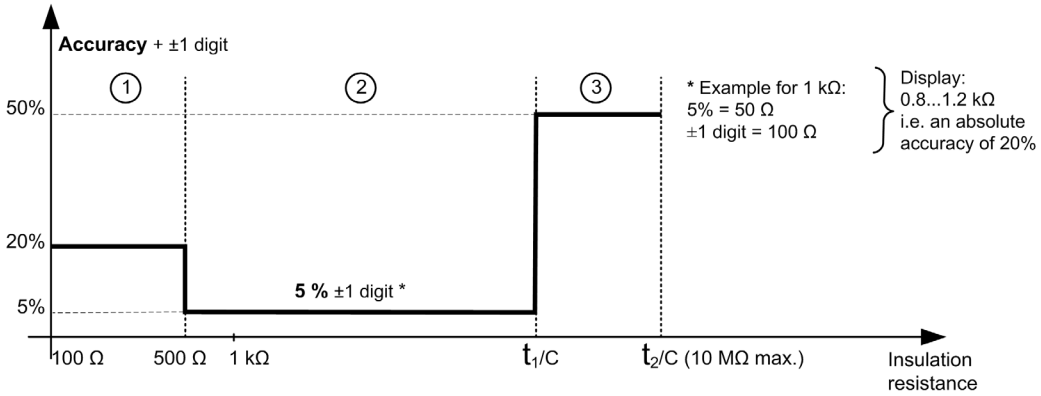
Possible Scenarios in Practice

The following situations may occur on an installation. The gray arrows represent the preferred route for the IMD injection signal.

R and C Value	R Weak (in the Event of a Fault)	C Medium, R Medium	R and C High
Equivalent Circuit Diagram			
Impact on Measurements	Most of the injection signal goes into R. Throughout the duration of the insulation fault, the R measurement is inaccurate. Measuring C is difficult, particularly if C is weak.	The injection signal is shared between R and C. R and C can be measured correctly.	The injection signal that goes into R is weak. It becomes difficult to measure R and is completely impossible in the case of very high C values. C is measured correctly.
Significance of R	Significant measurement for the installation	Significant measurement for the installation	Obtaining an accurate measurement of R is of no significance, as the system is sound.
Significance of C	Obtaining a measurement of C is of no significance when there is an insulation fault.	Significant measurement for the installation	Significant measurement for the installation An excessively high C value corresponds to the maximum limits of an IT system. Above 40 µF, the product is outside of its operating range and fails.

Accuracy Zones

The graph below illustrates the accuracy zones for the Vigilohm:



1 Level of R is weak (in the event of fault).
2 Levels of R and C are medium.
3 Levels of R and C are high.

- With **Filtering of 4 s**
  - $\tau_1 = 1$
  - $\tau_2 = 4$
- With **Filtering of 40 s**
  - $\tau_1 = 2$
  - $\tau_2 = 10$

Accuracy zone limit

In practice, the accuracy zone limit is linked to the product of R (MΩ) x C (µF). The Vigilohm limit is dependent on the type of filtering selected:

- With **filtering of 4 s**, $\tau_2 = R_{max} \times C = 4$
- With **filtering of 40 s**, $\tau_2 = R_{max} \times C = 10$

Example with filtering of 4 s:

τ_1 **= 1**	τ_2 **= 4**
If C = 1 µF: τ_1/C = 1 MΩ	If C = 1 µF: τ_2/C = 4 MΩ
If C = 10 µF: τ_1/C = 100 kΩ	If C = 10 µF: τ_2/C = 400 kΩ

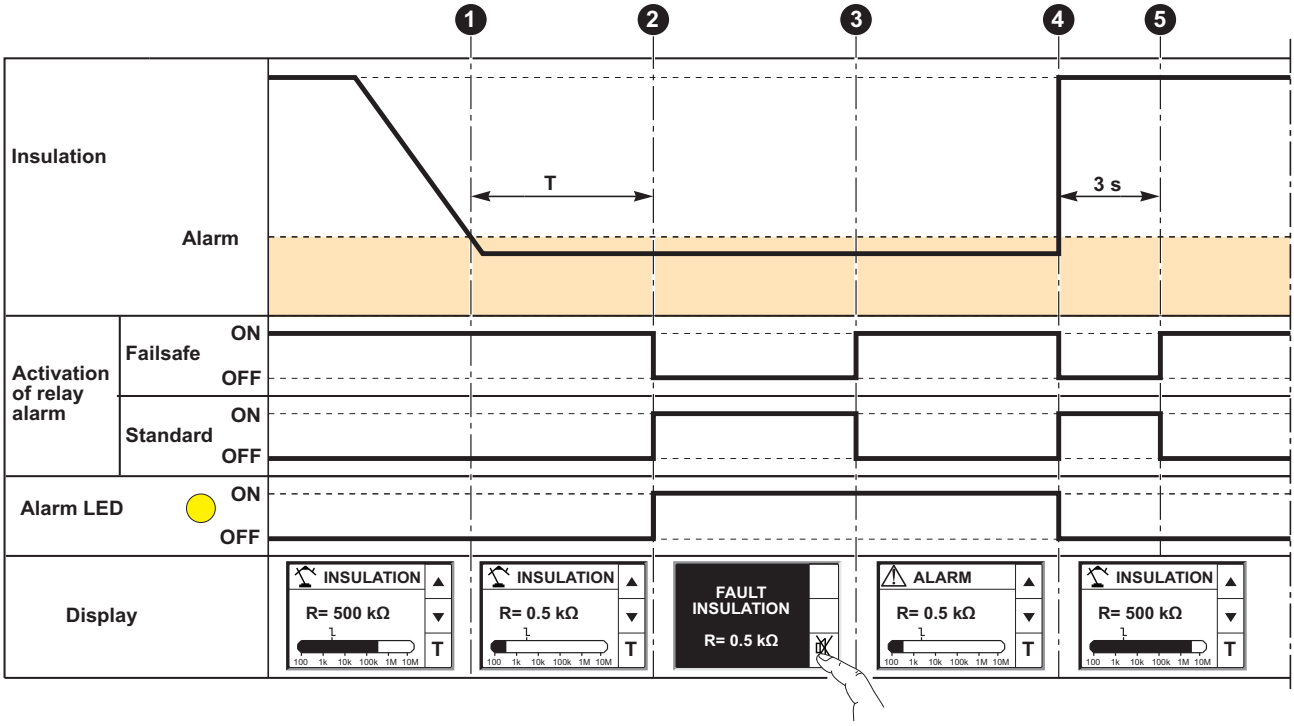
Example with filtering of 40 s:

τ_1 **= 2**	τ_2 **= 10**
If C = 1 µF: τ_1/C = 2 MΩ	If C = 1 µF: τ_2/C = 10 MΩ
If C = 10 µF: τ_1/C = 200 kΩ	If C = 10 µF: τ_2/C = 1 MΩ

Monitoring the System Insulation

Functional Description

The Vigilohm monitors the IT system insulation in kΩ in accordance with the following timing diagram:



1 An insulation fault is detected on the system.
2 Once T has elapsed (alarm time delay), the Vigilohm switches to the alarm status. The alarm relay changes over and the alarm LED lights up.
3 The user acknowledges the alarm by pressing the button. The alarm relay reverts to its initial status.
4 When the insulation fault has been corrected, the alarm relay changes over for 3 s so that the user knows that he or she has located the insulation fault (by opening circuit breakers in order to find the insulation fault, for example).
5 The Vigilohm reverts to normal status.

When the Vigilohm is in the alarm status and the user fails to acknowledge the alarm, the insulation fault is transient.

Status Information

The display and the 2 two-color LEDs on the Vigilohm indicate the device's current status.

LEDs		Description
ON	Alarm	
		Vigilohm de-energized
flashes slowly		Vigilohm energized, no insulation fault detected
flashes slowly		Vigilohm energized, pre-alarm detected
flashes slowly		Vigilohm energized, insulation fault detected
flashes slowly	flashes	Vigilohm energized, transient insulation fault detected
		Vigilohm energized but malfunctioning

Pre-alarm and Alarm Thresholds

You can set the pre-alarm and alarm thresholds as follows:

Threshold	Setting Range	Default Value
Pre-alarm	1 kΩ...1 MΩ	Inactive
Alarm	0.5...500 kΩ	1 kΩ

When the device is powered up, it reverts to the most recent pre-alarm and alarm threshold values saved.

The pre-alarm threshold must always be set higher than the alarm threshold.

Filtering (Measurement Quality)

On a system, the measurement varies continuously depending on the following:
- Number of loads
- Type of loads
- Load switching
- Size of the system (effect of C)

To prevent the display from fluctuating and to avoid inappropriate alarms, the measurements are filtered for 4 s or 40 s. The response time associated with this filtering function does not create any problems within the context of this application.

The **Filtering** parameter offers a choice between the following 2 modes:

Filtering	Description	Example of Use	Measurement Update Time When Monitoring the Insulation	Response Time Required to Detect an Insulation Fault
4 s	Allows optimization of the response time: • Manual fault location phase • Automatic location of a transient fault	To facilitate manual location of a fault by opening each of the circuit breakers in turn	0.8 s	4 s
40 s	Suitable for most applications	–	8 s	40 s

The default value for the **Filtering** parameter is **40 s**.

Alarm Time Delay

It sometimes makes sense to delay the triggering of an alarm while certain machines are starting up, otherwise erroneous alarms could be triggered. To set the alarm time delay, proceed as follows:

Setting	Setting Range	Default Value
Alarm time delay	0...600 s	0 s

The actual time delay lies somewhere between the selected value and this value plus 4 seconds.

Alarm Relay

Depending on the status of the insulation, the alarm relay is, or is not, activated according to the mode selected: failsafe (by default) or standard.

The failsafe alarm relay is activated in the following cases:
- An insulation fault is detected.
- The product has failed.
- The auxiliary voltage of the power supply is accidentally lost.
- When the insulation fault disappears, the alarm relay is activated for 3 seconds. This makes it easier to locate the fault when using the method that involves opening each of the circuit breakers in turn. Given that the circuit breakers may be located at some distance from the Vigilohm, the audible signal allows you to identify and locate the fault when working remotely.

System Frequency

To enable calculation of the Zc value, the frequency of the power system must be configured. The following DC values are supported (in the case of a DC system): 50 Hz, 60 Hz, and 400 Hz. The default value is 50 Hz.

Operation on Systems with a Voltage of More Than 480 Vac

If the device is being operated on a system with a voltage of more than 480 Vac with a high-voltage plate, the **HV plate** parameter must be configured as **HV1000**. The default value is **None** (operation without plate and on a system with a voltage of under 480 Vac).

Injection Inhibition Input (Vigilohm IM20)

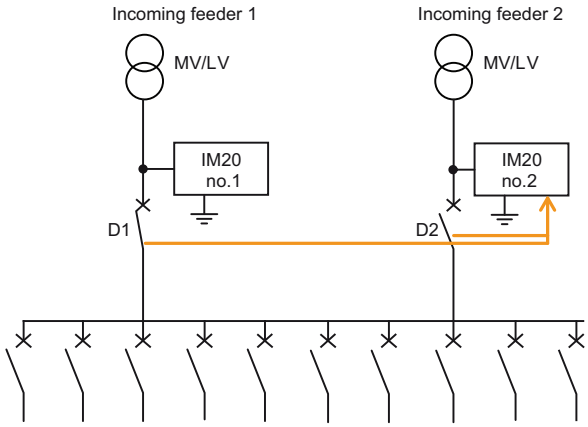
Exclusion

The IMD injects a low frequency into the system. In a system with several incoming feeders, depending on the circuit breaker position, there must be no more than one IMD injecting into the system.

This injection exclusion is managed by the inhibition input of the Vigilohm IM20, which is connected to the auxiliary contacts of the circuit breakers.

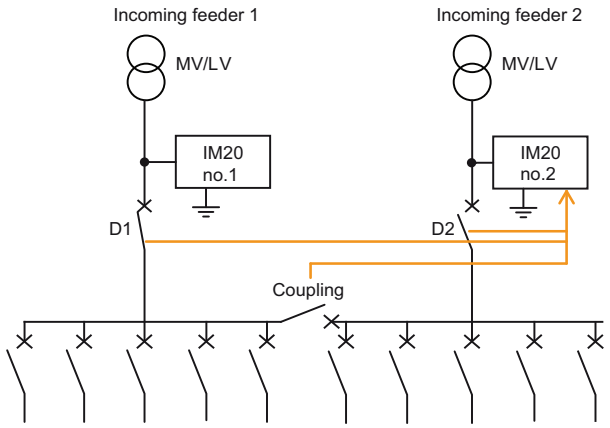
The injection inhibition input can be configured to use an NO contact (injection activated when the contact is open and injection deactivated when the contact is closed) or a NC contact (injection activated when the contact is closed and injection deactivated when the contact is open). The default value is NO.

Example of Exclusion with 2 Incoming Feeders



If...	Then...
• D1 is closed and • D2 is open	The 2 Vigilohm IM20 devices are active: • Vigilohm IM20 no.1 monitors the system insulation. • Vigilohm IM20 no.2 only monitors the insulation of the transformer 2 connection as far as D2.
• D1 is open and • D2 is closed	The 2 Vigilohm IM20 devices are active: • Vigilohm IM20 no.1 monitors the insulation of the transformer 1 connection as far as D1. • Vigilohm IM20 no.2 monitors the system insulation.
• D1 is closed and • D2 is closed	• Vigilohm IM20 no.1 monitors the system insulation. • Vigilohm IM20 no.2 must be inhibited.

Example of Exclusion with 2 Incoming Feeders and One Coupling

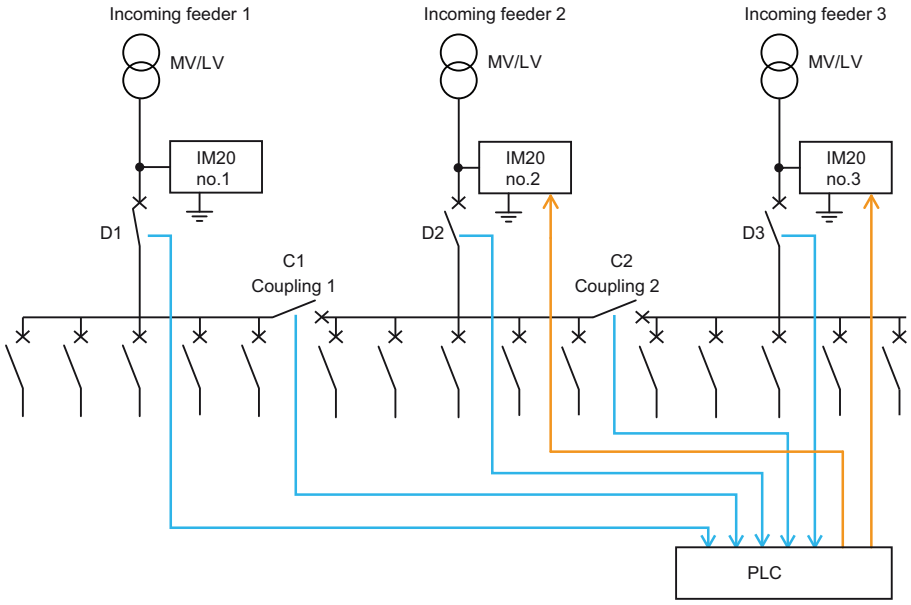


If...	Then...
The coupling is closed	The same applies as in the exclusion example above involving 2 incoming feeders.
• The coupling is open and • D1 is closed • D2 is closed	The 2 Vigilohm IM20 devices are active: • Vigilohm IM20 no.1 monitors the insulation of system 1. • Vigilohm IM20 no.2 monitors the insulation of system 2.

Vigilohm IM20 no.2 must be inhibited when the following 3 conditions are met:
- D1 is closed.
- D2 is closed.
- The coupling is closed.

Example of Exclusion with Multiple Incoming Feeders and Couplings

Using a PLC allows the wiring to be simplified and means that complex configurations can be considered.



Truth table:

Possible Configurations					**1 = Injection Inhibition**		
D1	**D2**	**D3**	**C1**	**C2**	**IM20 no.1**	**IM20 no.2**	**IM20 no.3**
0	0	0	0	0	0 (1)	0 (1)	0 (1)
0	0	0	0	1	0 (1)	0 (1)	0 (1)
...							
0	1	1	1	1	0 (1)	0 (2)	1 (3)
...							
1	1	1	1	1	0 (2)	1 (3)	1 (3)

(1) The Vigilohm IM20 monitors the transformer.
(2) The Vigilohm IM20 injects a signal into the system.
(3) The Vigilohm IM20 is excluded from the system (injection inhibited).

Injection Inhibition Screen

When the injection inhibition function of the Vigilohm IM20 is activated, the screen below appears and replaces any system status screen that may be showing already (insulation measurement, alarm or pre-alarm):

You can perform the following actions on this screen:

- Press the **Menu** button to access the main menu.
- Press the arrow contextual menu buttons to view the setting screen.
- Press the **T** contextual menu button to launch the self-test.

Self-test

Description

The Vigilohm has a self-test function for testing:
- The product: LEDs, internal electronics
- The measurement system and the alarm relay

Running the Self-test

The test can be run/runs:
- Manually at any time by pressing the **T** contextual menu button on one of the system insulation monitoring screens
- Automatically:
  - Whenever the device starts up (power-up or reset)
  - Every 5 hours (except when the device is in the alarm status, regardless of whether the alarm is active, has been acknowledged, or is transient).

Sequence of LEDs

During the verification sequence, the LEDs light up in the following order:
- **Alarm** white
- **ON** red
- **Alarm** yellow
- **ON** green

Self-test OK

If the self-test is successful, the following screen appears for 3 seconds:

After that, one of the status screens appears automatically (system insulation resistance measurement, insulation fault alarm, or IT transformer fault alarm).

Self-test Not OK

If the self-test fails, the **Alarm** LED turns red and a message is displayed to indicate that the product is malfunctioning.

If this happens, briefly disconnect the auxiliary power supply of the Vigilohm. If the fault persists, contact technical support.

Human Machine Interface

4

Presentation

The Vigilohm features a sophisticated and intuitive human machine interface (HMI) with signaling LEDs, a graphic display, and contextual menu buttons for accessing the information required to operate the Vigilohm and make parameter settings.

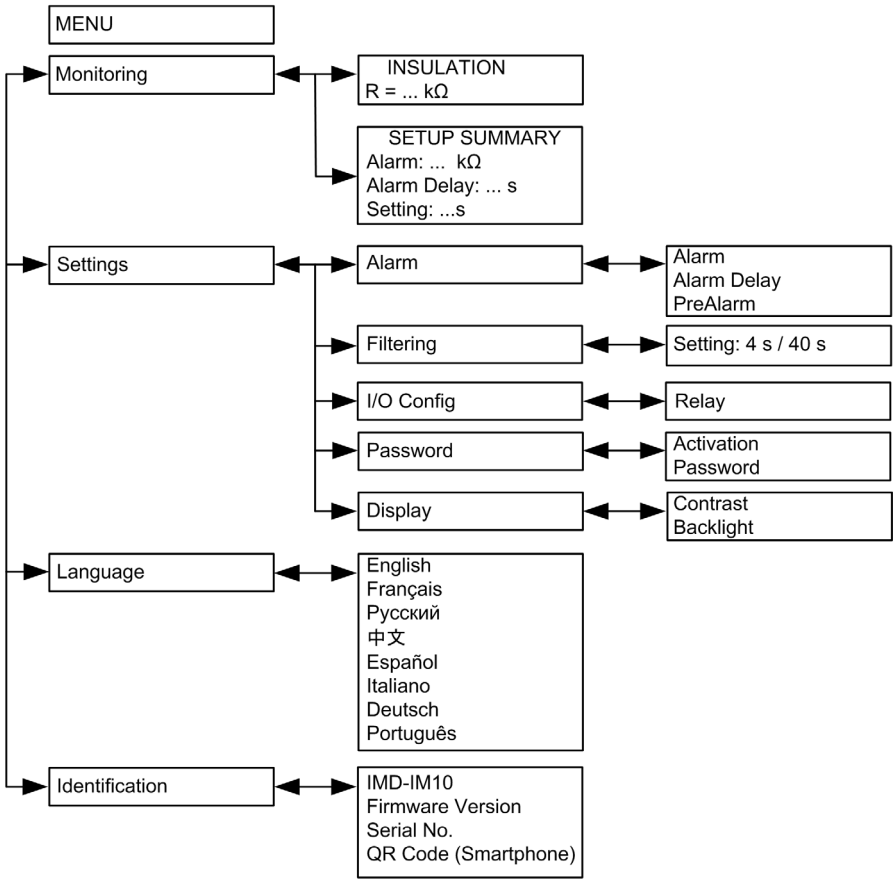
What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Vigilohm IM10 Menu Structure	36
Vigilohm IM20 Menu Structure	37
Navigating the Interface	38
Status Screens	40
Modifying Parameters	41
Clock (Vigilohm IM20)	42
Insulation Fault Log (Vigilohm IM20)	43

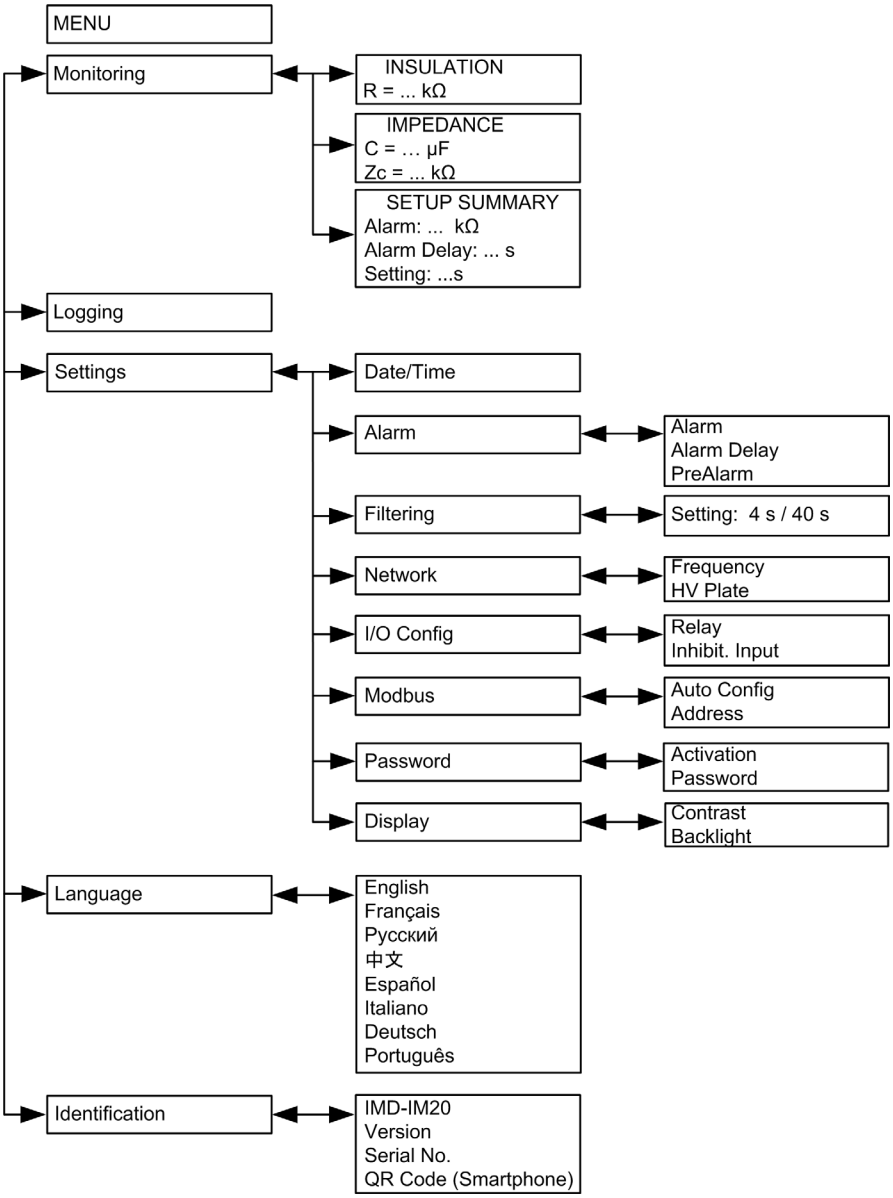
Vigilohm IM10 Menu Structure

Vigilohm IM10 Menu Structure



Vigilohm IM20 Menu Structure

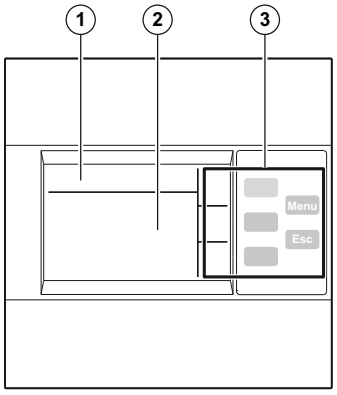
Vigilohm IM20 Menu Structure



Navigating the Interface

Presentation

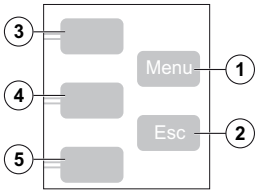
The diagram below illustrates the various elements for operating the Vigilohm.



1 Screen identification area containing a menu icon, and the name of the menu or parameter
2 Information area for displaying screen-specific details (measurement, alarm, setting)
3 Navigation Buttons

Navigation Buttons

The navigation buttons enable quick and intuitive navigation:



Legend	Button	Icon	Description
1	**Menu**	–	Displays the level 1 menu (**Menu**)
2	**Esc**	–	Takes you back to the previous level
3	Contextual menu button 3	▲	For scrolling up the display or moving to the previous item in a list
		🕒	For accessing the date and time setting If the clock icon flashes, it means that the Date/Time parameter needs to be set.
		✚	For increasing a numerical value
4	Contextual menu button 2	▼	For scrolling down the display or moving to the next item in a list
		←	For moving one digit to the left within a numerical value. If the digit on the far left is already selected, pressing the button loops you back to the digit on the right.
		→	For moving one digit to the right within a numerical value.
5	Contextual menu button 1	OK	For confirming the selected item
		T	For executing the manual test
		↵	For accessing a menu or sub-menu, or for editing a parameter
		🔇	For acknowledging alarms

Information Icons

The following table describes the icons provided for information in the information area of the LCD display. Among other things, they indicate which menu is selected or the alarm status.

Icon	Description
	Main menu
	• Identifies the system resistance when there is no insulation fault • Measurement parameters menu
	Fault log menu (Vigilohm IM20)
	Setting parameters menu
	Interface language selection menu
	Product identification
	Indicates an insulation fault alarm or pre-alarm

Status Screens

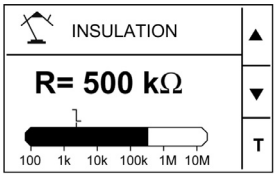
Presentation

The default screen is the one that shows the system's insulation resistance value. It is automatically replaced by an alert screen when an insulating fault occurs.

The screens for indicating an insulating fault flash.

System Insulation Resistance Measurement (R)

The Vigilohm displays the insulation resistance measurement for the system by default.



Alarm detected: Insulation Fault Message

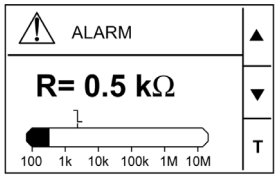
The following screen is displayed when the insulation value drops below the alarm threshold:

There are 2 possible scenarios:

- Acknowledge the alarm by pressing the contextual menu button.
- If you do not acknowledge the alarm and the system's insulation returns to a value above the alarm threshold, this results in a transient fault.

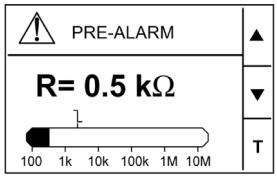
Alarm Acknowledged

The following screen appears once the alarm is acknowledged:



Pre-alarm Activated

The following screen appears when the pre-alarm is activated:



Transient Fault Message

The following screen appears in the event of a transient fault:

Acknowledge the transient fault by pressing the **OK** contextual menu button.

Modifying Parameters

Presentation

To modify any of the values, you must be thoroughly familiar with how the interface menus are structured and the general navigation principles. For more information about how the menus are structured, please refer to the section that relates specifically to your Vigilohm model:

- IM10 *(see page 36)*
- IM20 *(see page 37)*

To modify the value of a parameter, follow either of the 2 methods described below:

- Select an item (value plus unit) in a list.
- Modify a numerical value, digit by digit.

The parameters listed below are the only ones where the numerical value can be modified:

- Date
- Time
- Alarm triggering delay
- Password
- Modbus address (Vigilohm IM20)

Selecting the Value in a List

To select a value in a list: Use the ▼ or ▲ contextual menu buttons to scroll through the parameter values until you reach the desired value; then press **OK** to confirm the new parameter value.

Modifying the Numerical Value

The numerical value of a parameter is made up of digits and it is the one on the far right that is selected by default.

To modify a numerical value, use the contextual menu buttons as described below:

- ✚ allows you to modify the selected digit.
- ⬅ allows you to select the digit to the left of the one that is currently selected, or to loop back to the digit on the right.
- **OK** confirms the new parameter value.

Saving a Parameter

After you have confirmed the modified parameter, one of 2 things will happen:

- If the parameter has been saved correctly, the screen displays **Saved** and then automatically reverts to the previous display.
- If the parameter has not been saved correctly, the screen displays **Out of range** and the editing screen remains active. A value is deemed to be out of range when it is classed as forbidden or when there are several interdependent parameters, for example.

Aborting an Entry

To abort the current parameter entry, press the **Esc** button. The screen reverts to the previous display.

Clock (Vigilohm IM20)

Description

The time must be set:
- Whenever the power supply is interrupted
- When switching from winter to summer time

If the auxiliary power supply is interrupted, the Vigilohm IM20 retains the date and time setting from immediately before the interruption.

The Vigilohm IM20 uses the date and time parameter to time-tag the system insulation faults recorded.

Icon

When the Vigilohm IM20 is powered up, the clock icon flashes on the system monitoring screens to indicate that the clock needs to be set.

Setting

To set the date and time, please refer to the procedure for modifying a numerical value *(see page 41)*.

Date/Time Format

The date is displayed in the format: dd/mm/yyyy.

The time is displayed using the 24-hour clock in the format: hh/mm.

Insulation Fault Log (Vigilohm IM20)

Description

The Vigilohm IM20 records the details of the 30 most recent insulation fault events that have triggered one of the 2 statuses below:

- Pre-alarm
- Alarm

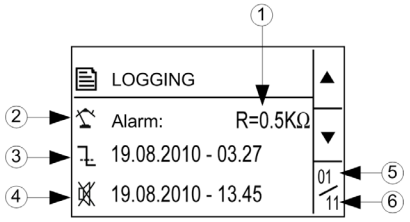
Event 1 is the one that was recorded most recently and event 30 is the oldest recorded event.

The oldest event is deleted when a new event occurs (the table is not reset).

By referring to this information, the performance of the distribution system can be improved and maintenance work facilitated.

Fault Event Screen

The figure below shows the display elements associated with an insulation fault event:



Legend	Description
1	Insulation fault value recorded
2	Type of insulation fault recorded: alarm, pre-alarm, transient alarm
3	Date and time when the alarm fault, pre-alarm, or transient fault occurred
4	Date and time when the event disappeared: ● Alarm acknowledgment ● Disappearance of pre-alarm or transient alarm
5	Number of event displayed
6	Total number of events recorded

Communication via Modbus RS-485 (Vigilohm IM20)

5

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Configuration of the RS-485 Communication Port	46
Table of Modbus Functions	47
Modbus Registers Table	48

Configuration of the RS-485 Communication Port

Communication Parameters

Before initiating any communication processes, configure the Modbus communication port via the HMI (**Settings** → **Modbus** menu) on the Vigilohm IM20:

Parameters	Authorized Values	Default Value
Baud rate	• 4800 Baud • 9600 Baud • 19 200 Baud • 38 400 Baud	19 200 Baud
Parity	• Even • Odd • None	Even
Address	1...247	1

Signaling of Communication Activity

On the Modbus parameter setting screen, the green **ON** LED indicates the status of communication between the Vigilohm IM20 and the master as follows:

If...	Then...
The LED is flashing	Communication with the device has been correctly established
The LED is on permanently	There is no active communication between the master and slave

Table of Modbus Functions

Modbus Functions

Function Code		Function Name
Decimal	**Hexadecimal**	
3	0x03	Read Holding Registers(1)
4	0x04	Read Input Registers(1)
6	0x06	Write Single Register
8	0x08	Diagnostics
16	0x10	Write Multiple Registers
67 / 14	0x43 / 14	Read Device Identification
67 / 15	0x43 / 15	Get Date/Time
67 / 16	0x43 / 16	Set Date/Timee
(1) The Read Holding and Read Input registers are identical		

Modbus Registers Table

Table Format

Register tables have the following columns:

Register Address Modbus		RW	Unit	Type	Range	Description
dec	hex					

- **Modbus Register Address**: Address of register encoded in the Modbus frame, in decimal (dec) and hexadecimal (hex) formats
- **RW**: Whether the register is read only (R) or read-write (RW)
- **Unit**: The unit the information is expressed in
- **Type**: The encoding data type
- **Range**: The permitted values for this variable, usually a subset of what the format allows
- **Description**: Provides information about the register and the values that apply

System Status

Register Address Modbus		RW	Unit	Type	Range	Description
dec	hex					
102...103	65...66	R	–	Uint16	Encoded version X.Y.Z	Firmware version X.Y.Z: • X represents the primary revision number, which is encoded in the most significant byte of register 102. • Y represents the secondary revision number, which is encoded in the least significant byte of register 102. • Z represents the quality revision number, which is encoded in register 103.
105	69	RW	–	Uint16	• 0...99 • –	• Year (from 2000 to 2099) in least significant byte • Most significant byte reserved
106	6A	RW	–	Uint16	• 1...12 • 1...31	• Month in most significant byte • Day in least significant byte
107	6B	RW	–	Uint16	• 1...23 • 0...59	• Time in most significant byte • Minutes in least significant byte
108	6C	RW	ms	Uint16	0...59999	Milliseconds

109	6D	R	–	Uint16	–	• Most significant byte = error code
						• Least significant byte = product status
						  • 0x00 - Normal operation
						  • 0x01 - Self-test
						  • 0x02 - Insulation fault
						  • 0x03 - Wiring connection lost
						  • 0x04 - Capacitance too high
						  • 0x05 - Faulty product

Monitoring

Register Address Modbus		RW	Unit	Type	Range	Description
dec	hex					
1000	3E8	R	Ohm	Float32	–	Resistance. The value NaN (Not a Number) 0xFFC00000 is returned during the self-test.
1002	3EA	R	nF	Float32	–	Capacitance. The value NaN (Not a Number) 0xFFC00000 is returned during the self-test.
1008	3F0	R	–	Uint16	• 0 = Injection activated • 1 = Injection deactivated	I/O wiring: Injection inhibition input

Alarm Status

Register Address Modbus		RW	Unit	Type	Range	Description
dec	hex					
1100	44C	R	–	Uint16	• 0 = No alarm • 1 = Alarm active • 2 = Pre-alarm active • 4 = Transient alarm • 8 = Alarm acknowledged	Alarm

Settings

Register Address Modbus		RW	Unit	Type	Range	Description
dec	hex					
3000	BB8	RW	–	Uint16	• 0 = Normally open • 1 = Normally closed	Injection inhibition input configuration Default value: 0 (Normally open).
3001	BB9	RW	–	Uint16	• 1 = Standard connection • 2 = Failsafe	Alarm relay logic command. Default value: 2 (Failsafe).
3002	BBA	RW	Ohm	Uint32	500 Ω...500 kΩ	Alarm threshold. Default value: 1 kΩ.
3004	BBC	RW	Ohm	Uint32	• 1 kΩ...1 MΩ • 0xFFFFFFFF = OFF	Pre-alarm threshold. OFF is used to deactivate the pre-alarm. Default value: 0xFFFFFFFF (Deactivated).
3007	BBF	RW	s	Uint16	0...300	Alarm delay. Default value: 0.
3008	BC0	RW	s	Uint16	• 4 s • 40 s	System filtering. Default value: 40 s.
3009	BC1	RW	Hz	Uint16	• 50 • 60 • 400 • 0 (for DC system)	System frequency. Default value: 50 Hz.
3014	BC6	RW	–	Uint16	0000...9999	Password. Default value: 0000.
3015	BC7	RW	–	Uint16	• 0 = Deactivated • 1 = Activated	Password protection. Default value: 0 (Deactivated).

3016	BC8	RW	–	Uint16	• 0 = English • 1 = Français • 2 = Русский • 3 = 中文 • 4 = Español • 5 = Italiano • 6 = Deutsch • 7 = Português	Interface language. Default value: 0 (English).
3017	BC9	RW	%	Uint16	0...100	Display contrast. Default value: 50.
3018	BCA	RW	%	Uint16	10...100	Display brightness. Default value: 100.
3019	BCB	RW	–	Uint16	• 0 = None • 1 = HV1000	HV plate. Default value: 0 (No plate).

Log

Register Address Modbus		RW	Unit	Type	Range	Description
dec	hex					
4000	FA0	R	–	Uint16	1...60	Number of event records
4001	FA1	R	–	Uint16	–	Number of most recent record
4002-4013	FA2-FAD	R	–	Record	–	Record 1
4014-4025	FAE-FB9	R	–	Record	–	Record 2
...						
4710-4721	1266-1271	R	–	Record	–	Record 60

Each event is stored using 2 records:
- A "primary" record, which is created when the alarm or pre-alarm occurs. This contains the insulation value.
- A "secondary" record, which is created when the alarm or pre-alarm disappears. This contains the type of event (acknowledged alarm, transient alarm, pre-alarm).

The 2 records are logged consecutively.

Description of an Event Record in the Log

Register	Unit	Type	Range	Description
Word 1	–	Uint16	1…65535	Event record number
Word 2 Word 3 Word 4 Word 5	–	Uint64	–	Time tagging of event (using the same code as for the product date/time)
Word 6 Word 7	–	Uint32	• 0...1 • 0x40, 0x10 • 1000, 1100	Record identifier: • Word 6, most significant byte: Information for primary/secondary record. This field assumes a value of 1 for the primary record and a value of 0 for the secondary record. • Word 6, least significant byte: Type of data stored in the **Value** field • Word 7: Address of the Modbus register that is the source of the data in the **Value** field
Word 8 Word 9 Word 10 Word 11	–	Uint64	–	Depending on the type of record (primary or secondary): • Insulation resistance value (in ohms) at the time of the event's occurrence (encoded in Float32 in the last 2 registers) • Alarm type (encoded in Uint16 in the last register)
Word 12	–	Uint16	1...65534	Primary/secondary record identifier for event: • In the case of a primary record for an event, this identifier is an odd integer; numbering starts at 1 and the number is incremented by 2 for each new event. • In the case of a secondary record for an event, this identifier is equal to the primary record identifier plus 1.

Example of an Event

The 2 records below represent an alarm that occurred at 12:00 on October 1, 2010 and was acknowledged at 12:29.

Record number: 1

Register Address Modbus		Unit	Type	Value	Description
dec	hex				
4002	FA2	–	Uint16	1	Record number
4003	FA3	–	Uint64	• 10 • 0 • 10 • 1 • 12 • 0 • 0	Date when alarm occurred (October 1, 2010, 12:00)
4007	FA7	–	Uint32	• 1 • 0x40 • 1000	Record identifier: • Primary record plus secondary record • Float32 value (insulation resistance) • Value of register 1000 (register for insulation resistance monitoring)
4009	FA9	Ohm	Uint64	10000	Insulation resistance value at the time of the alarm
4013	FAD	–	Uint16	1	Secondary record identifier for event

Record number: 2

Register Address Modbus		Unit	Type	Value	Description
dec	hex				
4014	FAE	–	Uint16	2	Record number
4015	FAF	–	Uint64	• 10 • 0 • 10 • 1 • 12 • 29 • 0	Date when alarm disappeared (October 1, 2010, 12:29)
4019	FB3	–	Uint32	• 1 • 0x10 • 1100	Record identifier: • Secondary record • Uint16 value (alarm acknowledged) • Value of register 1100 (alarm status register)
4021	FB5	–	Uint64	8	Value of alarm register at the time of alarm acknowledgement
4025	FB9	–	Uint16	2	Secondary record identifier for event

Maintenance and Troubleshooting

6

Maintenance and Troubleshooting

Safety Precautions

The following safety precautions must be thoroughly implemented before attempting to repair electrical equipment or carry out maintenance. Carefully read and follow the safety precautions described below.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK, ARC FLASH OR BURNS

- Wear suitable personal protective equipment and follow the currently applicable electrical safety instructions. See, for example, standard NFPA 70E when carrying out work in the USA.
- Only qualified personnel should maintain this equipment. Such work should be performed only after reading all the installation instructions.
- Turn off all power supplying this equipment before working on or inside it.
- NEVER work alone.
- Beware of potential hazards and wear personal protective equipment.

Failure to follow these instructions will result in death or serious injury.

NOTICE

RISK OF DAMAGE TO VIGILOHM

- Never open the Vigilohm unit.
- Do not attempt to repair any components in the Vigilohm range, either in the unit or an accessory.

Failure to follow these instructions can result in equipment damage.

ON LED

The red **ON** LED indicates an error relating to one of the following:
- Interruption of the injection circuit
- Self-test not OK
- Device fault
- Capacitance too high (C > 40 µF)

Interruption of the Injection Circuit

If the injection circuit of the Vigilohm is interrupted, the display shows the message below and starts flashing:

Self-test

The Vigilohm performs a series of self-tests on start-up, and then at regular intervals during operation, in order to detect any potential faults in its internal and external circuits. For more information on the self-test function, please refer to the relevant section *(see page 34)*.

Troubleshooting

The table below describes the potential problems and their probable causes. It also indicates the checks that can be carried out or provides possible solutions for each scenario. If you are still unable to resolve a problem after consulting the table, please contact your Schneider Electric regional sales representative for assistance.

Potential problem	Probable cause	Possible solution
The device displays nothing when switched on.	The device is not being supplied.	Check the auxiliary supply is present.
	The auxiliary supply does not comply.	Check the value of the auxiliary voltage: U = 110...480 Vac.
The device signals an insulation fault, but your system shows no signs of abnormal behavior.	The fault alarm threshold is not appropriate.	Check the value of the alarm threshold. Modify the alarm threshold if necessary.
	The fault pre-alarm threshold is not appropriate.	Check the value of the alarm threshold. Modify the alarm threshold if necessary.
You deliberately create an insulation fault, but the device fails to detect it.	The resistance value used to simulate the fault is greater than the value of the fault threshold.	Use a resistance value that is lower than the alarm threshold or modify the alarm threshold.
	The fault is not detected between neutral and ground.	Start again ensuring you are between neutral and ground.
The **ON** LED is red and the display shows "**WIRING CONNECTION LOST**".	The Vigilohm injection circuit is cut off.	Check the connection on the injection terminal block (terminals 1 and 3) and restart the self-test.
The **ON** LED is red and the display indicates that an error occurred during the self-test.	The Vigilohm injection circuit is cut off.	Briefly disconnect the auxiliary power supply for the Vigilohm.
Although the Vigilohm is being supplied with power, the **ON** LED does not light up.	Faulty LED.	Restart the self-test and check that the **ON** LED lights up briefly.
The **Alarm** LED does not light up in the event of a fault.	Faulty LED.	Restart the self-test and check that the **Alarm** LED lights up briefly.

Specifications

7

Specifications

Type of System to Be Monitored

Characteristic		Value
LV AC/DC IT systems	Phase-to-phase voltage range	0-480 Vac max.
		0-345 Vdc max.
	Frequency	45-440 Hz
	Limited in size	IT subsystem

Electrical Characteristics

Characteristic			Value
Range for insulation resistance readings			0.1 kΩ...10 MΩ
Range for capacitance readings (Vigilohm IM20)			0.1...40 µF
Fault signaling	Number of thresholds		2 (password protected)
	Prevent		1 kΩ...1 MΩ
	Fault		0,5...500 kΩ
Accuracy			5 %
Response time			≤ 5 s typical ≤ 5 s
Device operating test			Self-test and manual test
Internal impedance		At 50 Hz	110 kΩ
Failsafe feature(1)			1 (standard)
Output contact	Number		1 (standard or failsafe)
	Type of contact		Changeover
	Breaking capacity	250 Vac	6 A
	Capacity	12...24 Vdc	6 A
Input contact		Voltage supplied	24 V
Circuit breaker position		Minimum load	5 mA
Time delay on signaling			0...600 s
Auxiliary supply voltage		45-440 Hz	110-415 Vac ±15 %
		DC	125-250 Vdc ±15 %
Maximum device consumption			12 VA
Measurement voltage			75 V peak
Measurement current			0.9 mA
Dielectric strength			4000 Vac/5500 Vdc

(1) Failsafe: The relay is deactivated either on occurrence of a fault or if the auxiliary supply voltage accidentally fails.

Mechanical Characteristics

Characteristic		Value
Weight		0.25 kg
Thermoplastic case	Mounting	Panel or DIN rail
Degree of protection	Front	IP52

Other Characteristics

Characteristic			Value
Temperature range	For operation		–25...+55 °C
	For storage		–40...+70 °C
Climatic conditions(1)			IEC 60068
Use			Indoors
Altitude			Up to 2000 m
Degree of pollution			2
Maximum overvoltage			CAT III
Standards		Product	IEC 61557-8
		Safety	IEC 61010-1(2)
		Installation	IEC 60364-4-41

(1) Suitable for use in all climates:
- Damp heat, equipment not operating (IEC 60068-2-30)
- Damp heat, equipment operating (IEC 60068-2-56)
- Salt mist (IEC 60068-2-52)

(2) The nominal operating voltage is 300 V L-N according to standard IEC 61010-1.

Locating Faults Manually

Use a mobile fault locating kit (catalog number 50310), containing:
- 1 XGR locating signal generator
- 1 XRM locating signal receiver
- 3 tong-type current probes

For more information, please refer to the *Vigilohm 2011 Catalog*.

As the current injected by the Vigilohm IM10 or IM20 is insufficient for the XRM, the XGR 2.5 Hz injector must be used when locating faults. Proceed as follows:

1 Connect the XGR to neutral (if there isn't one, to a phase) and to ground.

2 Use the XRM to locate the fault: Calibrate to 18 to indicate the fault as a function of the fault current.

Ignore the measurement indicated by the Vigilohm IM10 or IM20, as the XGR may interfere with it.

VIGED310022EN

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As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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